In the claims:

1-21. (Cancelled)

22. (Currently Amended) A chemical mechanical polishing apparatus to polish a substrate, comprising:

a platen to support a polishing pad, the platen rotatable about an axis, the platen including a plurality of optical apertures positioned at different angular positions about the axis;

a carrier head to hold a substrate against the polishing pad;

a plurality of optical systems located in the platen, each of the plurality of optical systems including a light source to independently generate a light beam and direct the light beam through an associated one of the plurality of optical apertures, and a sensor to measure light from the light beam that is reflected from the substrate to generate an intensity signal; and

a processor to receive the intensity signal from each of the plurality of optical systems and determine a polishing endpoint.

23. (Original) The apparatus of claim 22, wherein the plurality of optical systems include a first optical system having a first light source to generate a first light beam and a second sensor to measure light from the first light beam that is reflected from the substrate to generate a first intensity signal, and a second optical system having a second light source to generate a second light beam and a second sensor to measure light from the second light beam that is reflected from the substrate to generate a second intensity.

24. (Original) The apparatus of claim 23, wherein the second light beam has a second effective wavelength that differs from the first effective wavelength.

25. (Original) The apparatus of claim 24, wherein the first light beam and the second light beam have different wavelengths.

26. (Original) The apparatus of claim 24, wherein the first optical system is an off-axis optical system and the second optical system is a normal-axis optical system.

27. (Original) The apparatus of claim 21, wherein the plurality of optical apertures are spaced evenly about the axis.

28. (Original) The apparatus of claim 27, wherein the platen includes exactly two optical apertures.

29. (Original) The apparatus of claim 21, further comprising a polishing pad supported on the platen, the polishing pad having a plurality of windows, each of the plurality of windows aligned with an associated one of the plurality of optical apertures in the platen.

30. (Original) The apparatus of claim 21, wherein at least one light beam has a wavelength of about 300-400 nm.

31-37. (Cancelled)

38. (New) The apparatus of claim 23, wherein the first light beam and the second light beam have the same propagation angle.

39. (New) The apparatus of claim 24, wherein the first optical system and the second optical system are off-axis optical systems.

40. (New) The apparatus of claim 23, wherein the first light beam and the second light beam have the same wavelength.

41. (New) The apparatus of claim 22, wherein the second light beam has a second wavelength that differs from a first wavelength of the first light beam.

42. (New) The apparatus of claim 21, wherein the plurality of optical apertures are about the same distance from the axis.

43. (New) The apparatus of claim 27, wherein the plurality of optical apertures are about the same distance from the axis.

44. (New) The apparatus of claim 22, further comprising an opaque polishing pad positioned on the platen, the polishing pad including a plurality of windows formed in the polishing layer and aligned with the plurality of optical apertures in the platen.

45. (New) The apparatus of claim 44, wherein the polishing pad includes a polishing layer and a backing layer.

46. (New) The apparatus of claim 44, wherein the windows include a solid light-transmitting material.

47. (New) The apparatus of claim 21, wherein at least one light beam has a wavelength of about 600-1500 nm.